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MINERALOGY.

—
'Lo! Vanity, with dazzling gems adorned,
Flaunts proudly by ;—
While Science pores upon a specimen
Rough from the bosom of its native mine.'
—

MINERALOGY is that branch of natural history which has for its object the description and discrimination of inorganized or mineral substances, as they are found in the earth or on its surface.

The knowledge of some mineral bodies may be considered as coeval with the earliest ages of the world. The rudest and most barbarous nations could not be ignorant of some of the properties of the substances which were the most familiar to their observation ; and mankind have made little progress in civilization, where they are entirely unacquainted with the nature of those matters from which some of the metals are extracted.

Precious stones, it seems not at all improbable, first attracted the attention of mankind. The richness of color, brilliancy, lustre and durability of these bodies, could not fail to excite admiration, and make them be sought after as ornaments, even by the least civilized people, and in countries where they are the most abundant. They were well known, it would appear from the sacred writings, among the Jews and Egyptians in the time of Moses. At this period, however, both the Jews and Egyptians had advanced far in refinement.

But this knowledge was too limited to be dignified with the name of *Mineralogy*. It wanted that comprehensive, connected and scientific view which could entitle it to that denomination. And indeed it may be said to be only of modern date that the knowledge of minerals rose to the rank of science, and assumed anything like a regular and connected form. From the ancients no information of any consequence on these topics is to be expected. The whole science of Mineralogy has been created since the year 1770, and is at present advancing towards perfection with astonishing rapidity. New minerals are every day described and analyzed, collections are everywhere forming, and travels of discovery are succeeding each other without intermission. The fruit of these labors has been the discovery of several new earths and metals, besides a vast number of useful minerals which had been formerly unknown or disregarded.

Nothing at first sight appears easier than to describe a mineral, and yet in reality it is attended with much difficulty. It is obvious, that to distinguish a mineral from every other, we must either mention some peculiar property, or a collection of properties which exist together in no other mineral. These properties must be described in terms rigidly accurate, which convey precise ideas of the very properties intended, and of no other properties. The smallest deviation of this would lead to confusion and uncertainty. Now it is impossible to describe minerals in this manner, unless there be a peculiar term for each of their properties, and unless this term be completely understood. Mineralogy, therefore, must have a language of its own; that is to say, it must have a term to denote every mineralogical property, and each of these terms must be accurately defined. The language of Mineralogy was invented by the celebrated Werner, of Freyburg, and first made known to the world by the publication of his treatise on the *External Characters of Minerals*. The object of this philosopher was to invent a method of describing minerals with such precision, that every species could readily be recognized by those who were acquainted with the terms employed. For this purpose, it was necessary to make use of those properties only which presented themselves to our senses on inspecting the mineral. These accordingly were chosen, and called by Werner *external characters*, because they may be ascertained without destroying the mineral examined. These constitute the first division of the characters of minerals. To the second belong those which are derived from the chemical composition, or discov-

ered by any chemical change which the mineral suffers ; to the third are referred those properties which are afforded by certain physical characters, as electricity or magnetism ; and to the fourth, a few characters derived from circumstances frequently observed with regard to a mineral, as the place where it is found, or the minerals by which it is usually accompanied.

Werner divides the external characters of minerals into two kinds, namely, *general* and *particular*. The general characters are color, cohesion, unctuousity, coldness, weight, smell and taste. The particular characters, aspect of the surface, aspect of the fracture, aspect of the distinct concretions, general aspect, hardness, tenacity, frangibility, flexibility, adhesion to the tongue, and the sound.

GENERAL CHARACTERS. The *colors* of minerals are extremely various. Werner conceives eight fundamental colors, and describes all the others as compounds of various proportions of these. The fundamental colors are snow white, ash gray, velvet black, Berlin or Prussian blue, emerald green, lemon yellow, carmine red and chesnut brown. With respect to *cohesion*, minerals are either solid, friable or fluid. With respect to *unctuousity*, minerals are distinguished into *greasy* and *meagre* ; the first have a certain degree of greasiness in the peel ; the second not. The other four general characters require no particular description.

PARTICULAR CHARACTERS. In the *aspect* of the surface of a mineral, three things claim attention : first, the *shape* of the mineral ; second, the *kind* of surface ; and third, the *lustre* of the surface, which is either splendent, shining, glistening, glimmering or dull. When a mineral is broken, the new surface exposed is called the *fracture*. Three things here claim attention : first, the *lustre* of the fracture ; second, the *kind* of fracture ; and third, the *shape* of the fragments. *Distinct concretions* are distinct masses, which may be separated from each other without breaking through the solid part of the mineral, by natural seams. Three particulars with respect to these are, first, their *shape* ; second, their *surface* ; and third, their *lustre*. Under the head of *general aspect* three particulars are comprehended : first, the *transparency* ; second, the *streak* ; -and third, the *soiling*, or the *stain* left when rubbed. Minerals are either *hard*, *semi-hard* or *soft*. With respect to *tenacity*, minerals are *brittle*, when on being cut with a knife the particles fly away with noise ; *sectile*, when the particles do not fly off but remain ; *ductile*, when the

mineral can be cut in slices. By *frangibility* is meant the resistance which minerals make when we attempt to break them. The degrees are five, namely, *very tough*, *tough*, *moderately tough*, *fragile* and *very fragile*. With respect to *flexibility*, some are *elastic*, some *common*, and others *inflexible*. Some minerals *adhere* to the tongue *very strongly*, some *moderately*, some *slightly*, and others *very slightly*. Some minerals give a *ringing* sound, some a *grating* sound, and others a *creaking* sound. With respect to *electricity*, some minerals become electric when *heated*, some when *rubbed*, and others cannot be rendered electric at all. The electricity of some is *positive*, and of others *negative*.

Minerals are usually arranged under four classes; *earthy*, *saline*, *inflammable*, and *metallic*.

The earthy minerals contain all such as derive their qualities from the earths; and they are divided into genera according to the particular earth which predominates in each, or more properly into families, according to their resemblance in external characters; as the diamond family, the ruby family and the talk family.

The saline minerals comprehend all the combinations of alkalies with acids which exist in the mineral kingdom; as salt-petre, (*nitrate of potash*.) common rock salt, (*muriate of soda*.) and sal-ammoniac, (*muriate of ammonia*.)

The inflammable minerals comprehend all mineral bodies that are combustible, except metals and the diamond, and include sulphur, resins, bitumens and graphite.

The metallic minerals comprehend all the mineral bodies that are composed either entirely of metals, or of which metals constitute the most considerable and important part. It is from the minerals belonging to this class that all metals are extracted, and for this reason they have been called ores. They are found in a native state, either simple, consisting only of one substance, or compound, when composed of more than one substance. It is our object, at present, to give a description of the metals, and afterwards to treat more generally on Mineralogy and Geology.

We shall take the liberty to conclude this introduction with a short, though elegant extract from the Young Lady's Book:

'Minerals have for years been pleading to us in their behalf: they meet our view on all sides; many of them even in their native state. They contribute essentially to our comfort, and add to our splendor; they embellish the lofty domes

and high places which are the pride of our country, and passively contribute to its defence; they adorn our parlors and our persons. Some of them are almost indispensable even to the cottager's wife, while others sit enthroned on the brows of royal beauty, exceeding all beneath 'the Lady Luna and her silvery train' in brilliancy, and equalling the chaplet with which Flora would bedeck herself, in richness and variety of hue; and although they possess not the fragrance of the rose buds, nor the graceful form of the lily, their durability exalts them to a higher value than that of the most lovely flower that basks in the noon-tide ray, or blows in the shade. The snowdrop melts away almost as soon as the white mantle that covers its birth-place; the violet delights our eye in the morning, and is withered by sunset; the queen of flowers endures but for a short period, and there are but a few of her subjects hardy enough to bear the scorching glance of a summer sun, and the chill breath of winter; but a diamond endures for ages, and is beautiful at all times and in all seasons. The ruby outlives a thousand generations of roses; and the holly and the laurel are ephemeral compared with the emerald.'

MAN.

(Continued from page 76.)

IV. THE AMERICAN VARIETY. (See Fig. 1.) *Characters.*—A dark skin, of a more or less red tint; black, straight and strong hair; small beard, which is generally eradicated; and a countenance and skull very similar to those of the Mongolian tribes. The forehead is low, the eyes deep, the face broad, particularly across the cheeks, which are prominent and rounded. Yet the face is not so flattened as in the Mongols; the nose and other features being more distinct and projecting. The mouth is large, and the lips rather thick. The forehead and vertex are in some cases deformed by art.

This variety includes all the Americans, with the exception of the Eskimaux.

The redness of the skin is not so constant, but that it varies in many instances towards a brown, and approaches in some situations to the white color. Cook states, that the natives of Nootka Sound have a color not very different from that of

Europeans, but with a pale dull cast; and Bouguer makes the same observation of the Peruvians on the Andes. Humboldt observes, that the denomination of copper colored men could never have originated in equinoctial America to designate the natives. Mr. Birkbeck says of the natives whom he saw in the western territory of the United States, 'that their complexion is various; some are dark, others not so swarthy as myself; but I saw none of the copper color, which I had imagined to be their universal distinctive mark.'

In describing the Chilians, Molina says, their complexion, like that of the other American nations, is of a redish brown, but it is of a clearer hue, and readily changes to white. A tribe who dwell in the province of Baroa are of a clear white and red, without any intermixture of the copper color.

The most accurate observers, in various parts of the continent, have particularly noticed the imperfect development of the forehead in the American race. In the natives of Nootka Sound, says Cook, the visage of most is round and full; and sometimes also broad, with high prominent cheeks; and above these the face is frequently much depressed, or seems fallen in quite across between the temples; the nose also flattening at its base, with pretty wide nostrils, and a rounded point. The forehead rather low. The same lowness of this region is remarked by Hearne in the northern Indians; by Lewis and Clarke, of the western tribes; by Rollin, the surgeon who accompanied La Perouse, of the natives on the western coast in 58° N. lat. of the Californians, and the Chilians; by Dampier, of those on the coast of Nicaragua and the Isthmus of Darien; and by Humboldt, of the Americans generally. In describing the Chaymas, he says that the 'forehead is small, and but little prominent. Thus in several languages of the countries, to express the beauty of a woman, they say that she is fat, and has a narrow forehead. A singular intellectual defect has been noticed in some Americans, and may, perhaps, be connected with this peculiarity in the configuration of the head. The Chaymas have a great difficulty in comprehending anything that belongs to numerical relations. I never saw a single man who might not be made to say that he was eighteen or sixty years of age.' Wafer observed the same circumstance in the Isthmus of Darien. The Indians attempted to reckon a party of between three and four hundred persons: one of them put a grain of maize into a basket for each that passed; but they could not cast it up. Some days after, twenty or thirty of the chief men came

together, and tried their skill. 'But, when they could tell no further (the number probably exceeded their arithmetic,) and seemed to grow very hot and earnest in their debates about it, one of them started-up, and, sorting out a lock of hair with his fingers, and shaking it, seemed to intimate the number to be great and unknown, and to put an end to the dispute. But one of them came after us, and inquired the number in broken Spanish.'

V. MALAY VARIETY. (See Fig. 2.) *Characters*.—Brown color, from a light tawny tint, not deeper than that of the Spaniards and Portuguese, to a deep brown approaching to black. Hair black, more or less curled, and abundant. Head rather narrow; bones of the face large and prominent; nose full and broad towards the apex; large mouth.

The inhabitants of the peninsula of Malacca, of Sumatra, Java, Borneo, Celebes, and the adjacent Asiatic islands; of the Molucca, Ladrone, Philippine, Marian and Caroline groups; of New Holland, Van Diemen's Land, New Guinea, New Zealand, and the numberless islands scattered through the whole of the South Sea, belong to this division. It is called Malay, because most of the tribes speak the Malay language: which may be traced, in the various ramifications of this race, from Madagascar to Easter Island.

Under this variety, to which in truth no well-marked common characters can be assigned, are included races of men very different indeed to be arranged with propriety under one and the same division, but hitherto too imperfectly known for the purposes of satisfactory arrangement.

In that division of the abodes of this race which may be called the Southern Asiatic, or East Indian islands, we find at least two very different organizations; namely, one negro-like, black, with strongly curled hair; another, of brown or olive color, with longer hair. The first, regarded as the aboriginal inhabitants, occupy some islands entirely, but are found in the larger ones in the mountainous interior parts, whither they seem to have been driven by the encroachments of newer settlers. They resemble the African Negroes in their black color, woolly hair, and general formation of the skull and features; and hence they are called, by the Dutch writers, Negroes and Moors. They are distinguished, however, by their language, and by a copious bushy beard. In Sumatra, they are called Batta; in Borneo, Biajos; in the Moluccas, Haraforas or Alfoeras; in the Philippines, Ygolotes. They are wild, barbarous and uncivilized, like their African kindred.

Mr. Symes, who visited the great Andaman Island on his voyage to Ava, describes the natives as seldom exceeding five feet, having slender limbs, large bellies, high shoulders, and large heads. They had woolly hair, flat noses, and thick lips; and skin of a deep sooty black. They are naked, and in a state of complete barbarism.

The lighter colored race, with more oval countenance, longer hair, and finer forms altogether, occupy the coasts of the larger islands, and some smaller ones entirely. Many of them show their Malay origin by their organization, language and manners; and appear to have gradually spread from the continent over the adjacent islands. Others, however, cannot be traced so satisfactorily to this source.

In the numerous larger and smaller islands of the South Sea, extending from New Holland to Easter Island over a space of nearly 140 degrees of longitude, very various tribes are found, of light brown or olive to black color, of woolly or long hair, tall or short, handsome or ugly; and that often very near each other. They may be arranged, as in the latter case, under two divisions; between which, however, there are several intermediate gradations forming an insensible transition from one to the other.

Negro-like men, with curly hair, occupy the south-western islands; and may, perhaps, have descended from the analogous race in the Moluccas and other East Indian islands. They are savage, ferocious and suspicious.

This race is found in New Holland and Van Diemen's Land, New Guinea, New Britain, and the adjacent group sometimes called Solomon's Islands, New Georgia and the Charlotte Islands, the New Hebrides, including Tanna, Mallicollo and others, New Caledonia, and the Freejee Islands.

The remaining islands of the South Sea, from New Zealand on the west, to Easter Island, contain a race of much better organization and qualities. In color and features, many of them approach to the Caucasian variety; while they are surpassed by none in symmetry, size and strength. They have made considerable advances in civilization, and readily learn the arts imparted by their European visitors.

THE BEAVER.

GRAND DIVISION—*Vertebralia*, possessing a vertebral column or spine.

CLASS—*Mammalia*, nourishing the young by milk. ORDER—*Arrosores*, having incisors in both jaws well adapted for gnawing. GENUS—*Castor*, comprising beavers. SPECIES—*Fiber*, frequenting the shores of rivers, streams or lakes.

In all countries, as man is civilized and improved, the lower order of animals is repressed and degraded. Either reduced to servitude, or treated as rebels, all their societies are desolated, and all their united talents rendered ineffectual. Their feeble arts quickly disappear, and nothing remains but their solitary instincts, or those foreign habits which they receive from human education. For this reason there remain no traces of their ancient talents and industry, except in those countries where man himself is a stranger; where, unvisited by his controlling power for a long succession of ages, their little talents have had time to come to their limited perfection, and their common designs have been capable of being united.

The beaver seems to be now the only remaining monument of brutal society. From the result of its labors, which are still to be seen scattered over the uninhabited parts of our country, we learn how far instinct can be aided by imitation. We from thence perceive to what degree animals, without language or reason, can concur for their mutual advantage, and attain by numbers those advantages which each, in a state of solitude, seems unfitted to possess.

If we examine the beaver merely as an individual, and unconnected with others of its kind, we shall find many other quadrupeds to exceed it in cunning, and almost all in the powers of annoyance and defence. The beaver when taken from its fellows, and kept in a state of solitude or domestic tameness, appears to be a mild, gentle creature, familiar enough, but somewhat dull and melancholy; without any violent passions or vehement appetites, moving but seldom, making no efforts to attain any good, except in gnawing the wall of its prison, in order to regain its freedom; yet this, however, without anger or precipitation, but calm and indifferent to all about, without attachment or antipathies, nei-

ther seeking to offend nor desiring to please. It appears inferior to the dog in those qualities which render animals of service to man; it seems made neither to serve, to command, nor to have connections with any other set of beings, and is only adapted for living among its kind. Its talents are entirely repressed in solitude, and only are brought out by society. When alone it has but little industry, few tricks, and without cunning sufficient to guard it against the most obvious and and bungling snares laid for it by the hunter. Far from attacking any other animal, it is scarcely possessed of the arts of defence. Preferring flight to combat, like most wild animals, it only resists when driven to an extremity, and fights only then, when its speed can no longer avail.

But this animal is rather more remarkable for the singularity of its conformation, than any intellectual superiorities it may be supposed in a state of solitude to possess.

THE COMMON BEAVER, (*castor fiber*.) (See Fig. 3.) **Characters.**—Snout short and thick, furnished with strong whiskers; *incisors*, or front teeth, very strong; anterior faces even and flat; posterior faces angular; *molars*, or back teeth, compound; their crowns nearly plain, presenting circumvolutions of enamel and grooves on their sides, namely, three external and one internal on the molars of the upper jaw, one external and three internal on those of the lower jaw; facial line rather arched; summit of the head flattened; eyes rather small, of a blackish color; ears short and rounded; neck short; body rather thick and short, particularly at its posterior part; back arched; tail very flat, broad, oval and naked, the skin of which is covered with scales, generally of an hexagonal form, thicker beneath than above. Five toes to each foot, the anterior short and not separate, the posterior longer and united by a membrane; fur consisting of two sorts of hair, one coarse and the other a very fine down. The fine soft hair is of a silver gray color, offering some differences of shades; the coarser hair, long, stiff and elastic, gray for the first two-thirds of its length, and terminated by a redish brown, from whence results the general color, which is more brilliant above than beneath; whiskers black; hair of the head and hands or feet, shorter than that of the other parts. The salivary glands very large; stomach at the right side of the upper orifice furnished with glands discharging into it, through eighteen orifices, a peculiar fluid.

DIMENSIONS.

	Feet.	Inches.	Lines.
Total length,	2	0	6
Length of the head,	0	5	0
Length of the tail,	1	0	0
Breadth of the tail,	0	4	0
Height before,	0	10	4
Height behind,	1	11	0
Length of the fore arm,	0	4	0
Length from the wrist to the end of the nails, 0	2	4	

The varieties of this species resolve themselves into white, black, olive, variegated and yellow.*

The beaver is found in most of the northern parts of Europe and Asia, and is very abundant in North America. It was once met with in Britain, but the species has long been there extinct.

The beaver is hunted for the sake of its fur, which is well known forms a considerable article in the manufacture of fine hats, and furnishes a valuable substance which is known by the name of *castor*. This substance is contained in two little bags, called the inuinal glands, each about the size of a hen's egg. It is of a brownish, oily consistence, has a disagreeable narcotic smell, and a bitterish acrid and nauseous taste. The castor which is imported from Russia is generally esteemed the most valuable; though in many cases that from Hudson's Bay has been found nearly if not fully equal to it.

Many accounts have been given of the manners and labors of this extraordinary animal, but we believe none are in general more correct than the following by Buffon.

The beavers begin to assemble in the month of June or July, for the purpose of uniting into a society. They arrive in numbers from all corners, and soon form a troop of 2 or 300. The place of rendezvous is generally the place fixed for their establishment, and is always on the banks of waters. If the waters be flat, and never rise above their ordinary level, as in lakes, the beavers make no dam; but in rivers or brooks, where the waters are subject to risings and fallings, they build a bank, and by this artifice they form a pond or piece of water which always remains at the same height. The bank traverses the river from one side to the other like a sluice, and is often from 80 to 100 feet long, by 10 or 12 broad at the base. This pile, for animals of a size so small,

* Bartram has indicated two species of beaver as inhabiting the United States, viz: 'Great beaver of Canada,' and 'Lesser beaver of Florida and Carolina.'

appears to be enormous, and supposes an incredible labor. But the solidity with which the work is constructed is still more astonishing than its magnitude. The part of the river where they erect this is generally shallow. If they find on the margin a large tree, which can be made to fall into the water, they begin with cutting it down to form the principal part of their work. This tree is often thicker than a man's body. By gnawing the foot of the tree with their four cutting teeth, they accomplish their purpose in a very short time, and always make the tree fall across the river. They next cut the branches from the trunk to make it lie level. These operations are formed by the whole community. Several beavers are employed in gnawing the foot of the tree, and others in lopping off the branches after it has fallen. Others at the same time traverse the banks of the river, and cut down smaller trees, from the size of a man's leg to that of his thigh. These they dress, and cut to a certain length to make stakes of them, and first drag them by land to the margin of the river, and then by water to the place where the building is carried on. These piles they sink down and interweave the branches with the larger stakes. This operation implies the vanquishing of many difficulties; for, to dress these, and to put them in a situation nearly perpendicular, some of the beavers must elevate with their teeth, the thick ends against the margin of the river, or against the cross tree, while others plunge to the bottom, and dig holes with their fore feet to receive the points that they may stand on end. While some are laboring in this manner, others bring earth, which they plash with their feet, and beat firm with their tails. They carry the earth in their mouths and with their fore feet, and transport it in such quantities that they fill with it all the intervals between the piles. These piles consist of several rows of stakes of equal height, all placed opposite to each other, and extend from one bank of the river to the other. The stakes facing the under part of the river are placed perpendicularly; but the rest of the work slopes upwards, to sustain the pressure of the fluid, so that the bank, which is 10 or 12 feet wide at the base, is reduced to two or three feet at the top. It has, therefore, not only all the necessary thickness and solidity, but the most advantageous form for supporting the weight of the water, for preventing its issue, and to repel its efforts. Near the top, or thinnest part of the bank, they make two or three sloping holes, to allow the surface water to escape, and these they enlarge or contract, according as the river rises or falls; and when any breaches are made in the bank, by sudden or

violent inundations, they know how to repair them as soon as the water subsides.

It would be superfluous, after this account of their public work, to give a detail of their particular operations, were it not necessary, in the history of these animals, to mention every fact, and were not the first great structure made with a view to render their smaller habitations more commodious. These cabins or houses are built upon piles near the margin of the pond, and have two openings, the one for going to the land, and the other for throwing themselves into the water. The form of the edifices is either oval or round, (See Fig. 4.) some of them larger and some less, varying from four or five to eight or ten feet in diameter. Some of them consist of three or four stories, and their walls are about two feet thick, raised perpendicularly on planks or plain stakes, which serve both for foundations and floors to their houses. When they consist but of one story, the walls rise perpendicularly only a few feet, afterwards assume a curved form, or terminate in a dome or vault, which serves them for a roof. They are built of amazing solidity, and neatly plastered both without and within. They are impenetrable to rain, and resist the most impetuous winds. The partitions are covered with a kind of stucco, as nicely plastered as if it had been executed by the hand of a man. In the application of this mortar, their tails serve for trowels, (See Fig. 5.) and their feet for plashing. They employ different materials, as wood, stone and a kind of sandy earth, which is not subject to dissolution in water. The wood they use is nearly all of the light and tender kinds, as alders, poplars and willows, which generally grow on the banks of rivers, and are more easily barked out and transported than the heavier and more solid species of timber. When they once attack a tree, they never abandon it till they cut it down and carry it off. They always begin the operation of cutting at a foot or a foot and a half above ground. They labor in a sitting posture; and, in addition to the convenience of this situation, they enjoy the pleasure of gnawing perpetually the bark and wood, which are most palatable to their taste; for they prefer fresh bark and tender wood to most of their ordinary aliment. Of these provisions they lay up ample stores to support them during the winter; but they are not fond of dry wood. It is in the water and near their habitations that they establish their magazines. Each cabin has its own magazine, proportioned to the number of its inhabitants, who have all a common right to the store, and never

pillage their neighbors'. Some villages are composed of 20 or 25 cabins. But these large establishments are rare, and the common republic seldom exceeds 10 or 12 families, of which each has his own quarter of the village, his own magazine and his separate habitation. They allow no stranger to sit down in their neighborhood. The smallest cabins contain 2, 4 or 6, and the largest 18, 20, and it is alleged sometimes 30 beavers. They are almost always equally paired, being about the same number of females as of males. Thus, upon a moderate computation, the society is often composed of 150 or 200, who all at first labored jointly in raising the great public building, and afterwards, in select tribes or companies, in making particular habitations. In this society, however numerous, an universal peace is maintained. Their union is cemented by common labors, and it is rendered perpetual by mutual convenience, and the abundance of provisions which they amass and consume together. Moderate appetites, a simple taste, an aversion against blood and carnage, deprive them of the idea of rapine and war. They enjoy every possible good, while man only knows how to pant after it. Friends to each other, if they have some foreign enemies they know how to avoid them. When danger approaches, they advertise one another by striking their tail on the surface of the water, the noise of which is heard at a great distance, and resounds through all the vaults of their habitations. Each takes his post; some plunge into the lake, others conceal themselves within these walls, which can only be penetrated by the fire of heaven or the steel of man, and which no animal will attempt either to open or to overturn. These retreats are not only very safe, but neat and commodious. The floors are spread over with verdure; the branches of the box and the fir serve them for carpets, upon which they permit not the least dirtiness. The window that faces the water answers for a balcony to receive the fresh air, and to bathe. During the greatest part of the day, they sit on end, with their heads and anterior parts of the body elevated, and their posterior parts sunk in the water. This window is made with caution, the aperture of which is sufficiently raised to prevent its being stopped up with ice, which in the beaver climates is often two or three feet thick. When this happens, they slope the sole of the window, cut obliquely the stakes which support it, and thus open a communication with the unfrozen water. This element is so necessary, or rather so agreeable to them, that they can seldom dispense with it. They often swim a long way under the

ice; it is then that they are most easily taken, by attacking the cabin on one hand, and, at the same time, watching at a hole made at some distance, where they are obliged to repair for the purpose of respiration. The continual habit of keeping their tail and posterior parts in the water, appears to have changed the nature of their flesh. That of their anterior parts, as far as the reins, has the taste and consistence of the flesh of land or air animals; but that of the tail and posteriors has the odor and all the other qualities of fish. The tail is just like an extremity or genuine portion of a fish attached to the body of a quadruped. It is entirely covered with scales, and with skin perfectly similar to those of large fishes. They may be scraped off with a knife, and, after falling, they leave an impression on the skin, as is the case with all fishes.

It is in the beginning of summer that the beavers assemble. They employ the months of July and August in the construction of their bank and cabins. They collect, in September, their provisions of bark and wood; afterwards they enjoy the fruits of their labors, and taste the sweets of domestic happiness. This is the time of repose and the season of love. Knowing and loving one another from habit, from the pleasures and fatigue of common labor, each couple join not by chance, nor by the pressing necessities of nature, but unite from choice and from taste. They pass together the autumn and the winter, and, perfectly satisfied with each other, they never separate. At ease in their cabins, they go not out but upon agreeable or useful excursions, to bring in supplies of fresh bark, which they prefer to what is too dry, or too much moistened with water. The females generally bring forth two or three young ones near the end of the winter. About this time they are left by the males, who retire to the country to enjoy the pleasures and the fruits of the spring. They return occasionally to their cabins, and are occupied in nursing, protecting, and rearing their young, who at the end of a few weeks are in a condition to follow their dams. The females, in their turn, make little excursions to recruit themselves by the air, by eating fresh bark and herbage; and in this manner pass the summer upon the waters and in the woods. They assemble not again till autumn, unless their banks or cabins be overturned by inundations, for when accidents of this kind happen, they suddenly collect their forces in order to repair the breaches which have been made.

Some places they prefer to others for their habitations; and they have been observed, after having their labors fre-

quently destroyed, to return every summer to repair them, till being fatigued with this persecution, and weakened by the loss of several of their numbers, they took the resolution of changing their abode, and of retiring to solitudes still more profound. It is in winter that they are chiefly sought by the hunters, because their fur is not perfectly sound in any other season : and after their village is ruined, and numbers of them are taken, the society is sometimes too much reduced to admit of a fresh establishment ; but those which escape death or captivity, disperse and become vagabond. Their genius, withered by fear, never again expands. They hide themselves and their talents in holes ; or, sunk to a condition of other animals, they lead a timid and solitary life. Occupied only by pressing wants, and exerting solely their individual powers, they lose forever those social qualities which we have been so justly admiring.

From the foregoing considerations we see with what wonderful circumstances, and with what diversified means these animals are regulated, in order to preserve a due unity, and yet each performing a distinct and separate part.

But however such phenomena may excite our admiration as proofs of the care which has been bestowed on each portion of the natural world, yet when we come to reflect that the beaver, so ingenious and so provident in this particular instance, when brought to the test of domestication, has proved totally incapable of being instructed in any other operations beyond those we have detailed, and certainly much less so than many other animals under similar circumstances, we can only consider its actions as a perfection of instincts which are necessary to the preservation of the animal under all the contingencies to which it is exposed, and not in the least degree connected with reason, whose attributes are not confined to the accomplishment of one particular object, as in the beaver, nor to any specific mode of performance ; and it is to this circumstance that we may attribute the difference between human and natural architecture. The one, as liable to a fluctuating judgment, however diversified by a variety of plans so as to answer very multiplied purposes, is often deficient in some of its most essential parts ; while the other, depending upon fixed and invariable laws, is always perfect, and calculated to produce the desired effect even in the minutest particular, but is uniformly limited to one object, from which in no other instance deviates.

WHITE ANTS.

(Continued from page 84.)

IN our last number we gave a description of the city of the Termites; we shall now give some further account of its inhabitants.

The Termites are represented by Linné as the greatest plagues of both Indies, and indeed, between the tropics, they are justly so considered, from the vast damages and losses which they cause: they perforate and eat into wooden buildings, utensils, furniture, and all kinds of household stuff and merchandise; these they totally destroy, if their progress be not timely stopped. A person residing in the equinoctial regions, although not incited by curiosity, must be very fortunate if the safety of his property do not compel him to observe their habits.

When they find their way, says Kirby, into houses or warehouses, nothing less hard than metal or glass escapes their ravages. Their favorite food, however, is wood; and so infinite is the multitude of assailants, and such the excellence of their tools, that all the timber work of a spacious apartment is often destroyed by them in a night. Outwardly, everything appears as if untouched; for these wary depredators, and this is what constitutes the greatest singularity of their history, carry on all their operations by sap or mine, destroying first the inside of solid substances, and scarcely ever attacking their outside, until first they have concealed it and their operations with a coat of clay.

An engineer having returned from surveying the country, left his trunk on a table; the next morning he found not only all his clothes destroyed by white ants or cutters, but his papers also, and the latter in such a manner, that there was not a bit left of an inch square. The black lead of his pencils was consumed, the clothes were not entirely cut to pieces and carried away, but appeared as if moth-eaten, there being scarcely a piece as large as a shilling that was free from small holes; and it was further remarkable, that some silver coin which was in the trunk had a number of black specks on it, caused by something so corrosive that they could not be rubbed off, even with sand. One night, says Kemper, in a few hours they pierced one foot of the table, and having in that manner ascended, carried their arch across it, and then

down through the middle of the other foot into the floor, as good luck would have it, without doing any damage to the papers left there.

The destructiveness of these insects is, perhaps, one of the most efficient means of checking the pernicious luxuriance of vegetation within the tropics; no large animal could effect in months what the white ant can execute in weeks; the largest trees which falling would rot and render the air pestilential, are so thoroughly removed, that not a grain of their substance is to be recognized. Not only is the air freed from this corrupting matter, but the plants destroyed by the shade of these bulky giants of the vegetable world are thus permitted to shoot.

In those countries the white ants serve for food. In some parts of the East Indies the natives catch the winged insects just before their period of emigration, in the following manner;—they make two holes in the earth, one to the windward and the other to the leeward of their habitation: at the leeward opening they place the mouth of a pot, the inside of which has been previously rubbed with an aromatic herb called *bergera*; on the windward side they make a fire of materials of an offensive smell, which not only drives these insects, but frequently the hooded snakes also, into the pots, on which account they are obliged to be cautious in removing them. By this method they catch great quantities, of which they make with flour a variety of pastry, which they can afford to sell very cheap to the poorer ranks of people. When this sort of food is used too abundantly, it produces cholera, which kills in two or three hours.

It also seems that, in some form or other, these insects are greedily eaten in other countries; thus, when, after swarming, shoals of them fall into the rivers, the Africans skim them off the surface with calabashes, and bringing them to their habitations, parch them in iron pots over a gentle fire, stirring them about as is usually done in roasting coffee. In that state, without sauce or any other addition, they consider them delicious food, putting them by handfuls into their mouth as we do comfits: 'I have,' says Smeathman, 'eaten them dressed in this way several times, and think them delicate, nourishing and wholesome; they are something sweeter, though not so fat and cloying, as the caterpillar or maggot of the palm-tree snoutbeetle (*Curculio palmarum*), which is served up at all the luxurious tables of the West Indian epicures, particularly of the French, as the greatest dainty of the western world.'

The collection of provisions for the use of the colony is an employment which necessarily calls for incessant attention. These, to the naked eye, appear like raspings of wood; and they are, as before stated, great destroyers of timber, whether wrought or unwrought; but when examined by the microscope, they are found to consist chiefly of gums and the inspissated juices of plants, which, formed into little masses, are stored up in the magazines.

When any one is bold enough to attack their nest and make a breach in its walls, the laborers who are incapable of fighting retire within, and give place for another description of its inhabitants, whose office is to defend the fortress when assailed by enemies;—these, as before observed, are the neuter or soldiers. If the breach be made in a slight part of the building, one of these comes out to reconnoitre; he then retires and gives alarm. Two or three others next appear, scrambling as fast as they can one after the other. To these succeed a large body, who rush forth with as much speed as the breach will permit—their numbers continually increasing during the attack. It is not easy to describe the rage and fury by which these diminutive heroes seem actuated. In their haste they frequently miss their hold and tumble down the sides of their hill. They soon, however, recover themselves, and being blind, bite everything they run against. If the attack proceeds, the bustle and agitation increase to a tenfold degree, and their fury is raised to the highest pitch. Wo to him whose hands or legs they can come at! for they will make their fanged jaws meet at the very first stroke, drawing as much blood as will counterpoise their whole body, and never quitting their hold, even though they are pulled limb from limb. The naked legs of the Negroes frequently are exposed to this injury; and even the stockings of the European are not sufficient to defend him.

In half an hour after the enemy ceases to batter, they retire into the nest, as if they supposed the wonderful monster that damaged their castle to be beyond their reach. The laborers, who had fled on the first alarm, are now seen hastening to repair the breach, every one with a burden of ready tempered mortar in its mouth. This they stick on to the breach with such wonderful celerity and order, that although thousands, nay, millions, seem employed, yet they never embarrass one another. While the laborers are thus engaged, the soldiers retire, except here and there one, who saunters about, never touching the mortar. One, in particular, places itself close to the part undergoing repair; it may be seen turning leisurely on all sides, and every now and then, at an interval of

a minute or two, lifting up its head, and with its forceps beating upon the building and making a vibrating noise, on which a loud hiss, apparently from the whole body of laborers, issues from within the dome and all the subterranean passages. That it comes from the laborers is very evident, for all these may be seen hastening at every such signal, redoubling their pace and working as fast again. Attack the nest again, and with a loud hiss the laborers disappear, and the soldiers rush out; so that the experiment yields constantly the same result, of laborers at work and soldiers rushing to battle, the duties of each being as distinct as night and day.

There is no animal that comes within their reach but they are able to conquer. Mr. Smeathman says that an immense body of African ants which appeared, as they moved along, like the whole earth in agitation, covered and arrested a solemn elephant, as he was unsuspectingly grazing on the plain—that in eight hours after attacking him no trace was left either of the devastation or devastated, except the skeleton of the noble animal neatly licked;—a standing proof of the power of numbers against a single force!

Smeathman gives the following account of the marching *Termes* (*Termes viarum*.) While sauntering very silently in the hopes of finding some sport, on a sudden he heard a loud hiss, which, on account of the many serpents in those countries, is a most alarming sound. The next step produced a repetition of the sound; and then he saw with astonishment and delight, an army of the marching ants emerging from the ground. Their march was orderly, and very rapid, and their numbers prodigious. They were divided into two columns sixteen abreast, composed chiefly of laborers, with here and there a huge soldier that appeared like an ox among sheep; other soldiers kept a foot or two from the column, apparently acting as videttes, appointed to guard against surprise; others mounted the plants or blades of grass which flanked the main bodies, and, thus elevated a foot or more, looked over and controlled the proceedings of the moving multitude. They turned their heads in the different directions whence danger might arise, and every now and then struck their forceps against the plant, which produced a ticking sound, to which the whole army answered simultaneously with a loud hiss, and quickened their pace. After proceeding thus for about fifteen paces, the two columns united and sunk into the earth. The stream, however, continued to flow on for more than an hour, during which Mr. Smeathman watched their movements. The rear was brought up by a large body of soldiers.

THE VINE.

NATURAL ORDER—*Vites*, vines, fruit astringent and refrigerant. CLASS—*Pentandria*, having five stamens. ORDER—*Monogynia*, having one pistil. GENUS—*Vitis*, comprising vines. SPECIES—*Vinifera*, productive of wine.

(Continued from page 31.)

CATAWBA GRAPE. This is a large grape, of a lilach color, covered with a beautiful bloom, giving to it a bluish purple appearance. The berries have a slight musky taste and delicate flavor, hang loosely on the bunches; and, in fact, they are beautiful to the eye, very abundant bearers, make an excellent wine, and are tolerable for the table. The pulp diminishes and almost disappears when they are left on the vine until they attain to perfect maturity.

The color of the fruit is much varied according to its relative exposition; such as is fully exposed to the sun's rays is purple, that but partially exposed is of a lilach hue, and those clusters that are completely obscured and shaded, are nearly white, and the berries almost transparent; even in this latter position where, of course, the maturation is retarded, the fruit is sweet, but is devoid of that musky flavor which is acquired by that portion fully exposed to the sun and heat. It is earlier in ripening than the Bland, and the berries and clusters are of equal and often rather larger size. It is said to be from the river Catawba.

BLAND'S PALE RED GRAPE. The foliage of this vine is of a pale green hue; the bunches are shouldered or divided, and are five or six inches in length, and sometimes more. The berries are of a round or oblate form, of a pale red color, good size, juicy, sweet, and of very pleasant flavor. In some cases they are said, at full maturity, to become of a dark purple or red wine color. It is an agreeable table fruit, with a thin skin and little or no pulp, and is also a wine grape of very superior order to many of the varieties cultivated as such; indeed, a person has but once to taste this grape to form his decision on this point.

It is said that Mr. Bland of Virginia was among the first that brought this vine into notice and cultivation, from which circumstance his cognomen was attached to it at that time, by which title it has been most generally known since. The

original vine is said to have been found on the eastern shore of Virginia, by Mr. Bland, who presented scions of it to Mr. Bartram and to the late Mr. Samuel Powel, and some of the persons who obtained it from the latter gave it the title of Powel grape after him.

Heretofore this grape has been deemed unsuitable for latitudes as far north as we are, but it is now found to succeed perfectly in this city; and the past season the fruit attained complete maturity by the last of September or beginning of October.

BLACK HAMBURG GRAPE. It is this grape which is stated by English authors to have produced at Hampton Court, on a single vine, more than a ton weight of grapes in one season, as mentioned at page 29. The leaves are almost smooth on the under side, or very slightly pubescent; they are pretty deeply five lobed, with the border unequally indented. The bunches are six to nine inches in length, regularly shouldered, and descending to a point, so as to form an elongated triangle. There is a greater regularity throughout the bunches generally, than in those of most other grapes, and they commonly average in weight from one to one and a half pounds, though many are met with weighing two pounds. The berries are large, oval, somewhat rounded, of a deep violet color approaching to black; they are sweet, of a delicate consistence, and of very pleasant flavor; the only fault is, that the skin is rather thick.

This vine is remarkable for the strength of its shoots, which often produce several bunches the second year from the layer or cutting, and can always be made to do so the third year without injury. It is a regular and great bearer, and held in high esteem for that and its other qualities. In England it is considered one of the most uncertain to ripen in open culture, but in the vicinity of New York it succeeds perfectly in that manner, and matures its fruit towards the end of September. In this city it is cultivated on garden trellices, and ripens well in warm seasons and in favorable situations; it is also cultivated here, to a very great extent, in grape houses of a cheap construction.

WHITE OR GOLDEN CHASSELAS GRAPE. This variety of the grape is considered the chasselas, *par excellence*, of the French collections, and is more extensively cultivated there than any other variety, which has caused it to receive in different localities, a great diversity of names. The leaves are of medium size, pretty deeply serrated, and bordered with large, but not

very acute indentures. The clusters of fruit are generally large and long, and the most part of them shouldered. The berries are round, varying somewhat in size; the medium ones are about eight lines in diameter, and rather less in height. The skin is firm, but delicate, of a light green, which at perfect maturity takes a yellowish tint, and on the sun side becomes of an amber color. The flesh is very melting, white, a little inclining to green, with abundant juice, which is very sweet and agreeable. It has two to four seeds, which are green, marked with gray; the shoots are of a light yellow color, and stronger than those of many other vines. This is the most esteemed of all the grapes cultivated in the climate of Paris, on account of its excellence and long continuance.

WHITE FRONTIGNAC GRAPE. This is a highly esteemed grape for the table: the leaf is not deeply serrated, but it is of a darker green, and more acutely dentated than that of the white chasselas. The five lobes which divide it are unequal, the middle one being much broader than the others; the bunch is long, narrow, almost conical, and terminates in a point; it does not swell out at the top like the chasselas, nor have shoulders as that generally does. The berries, which are about the size of the chasselas, are in general very closely set, so that some persons thin them out in order to advance their maturity; their form is a little elongated, and rather larger at the head than at the extremity.

The skin is firm and crackling, light green, with a slight bloom, and of an amber hue on the sun side. The pulp is melting, white, with a bluish cast, and of a high and exquisite musk flavor. The seeds are small, white, marbled with gray or violet, and ordinarily three or four in number in each berry.

It is cultivated considerably in the grape houses in this vicinity, ripening a little later than the chasselas. It is considered one of the most luscious and desirable grapes with which our tables can be furnished.

WHITE SWEET WATER GRAPE. This is a round grape, with a thin skin, and of a delicate flavor; it is a great bearer, and resembles the white chasselas in almost every respect, except that it ripens much earlier, being usually in perfection from the 20th to the end of August at New York, and in this state in September. It is recommended as particularly suitable for the country, and for more northern latitudes, where, with attention, it will be sure to yield plentifully and regularly.

REMARKS ON THE CULTURE OF THE VINE.

The French boast that their country possesses greater advantages than any other for the culture of the vine, and that for centuries her vineyards have been regarded as one of the principal sources of her territorial riches, and that the exportation of their produce has been the certain means of making the balance of trade with foreign nations at all times in her favor. If we banish from our recollection the once luxuriant fields of now enervated Italy, and pass from the recollection of the genial climes and bright sun of Spain and Portugal, we shall doubtless be compelled to acquiesce with the sons of France, so far as relates to the eastern hemisphere; but when we recur to our own happy country, combining every variety of climate and soil, with the conscious knowledge that she is yet but in her infancy, and look forward with the gaze of anxious hope to her high destiny, can we as Americans fail to reply to that nation in her own language,

*‘Voilà l’Amerique ta rival!’**

Too long indeed have the natural riches of our soil remained subject to the bias of contracted vision, and dormant beneath the eye of prejudice. Too long indeed have Americans listened to the counsel of strangers to their country and to its interests, rather than seek for facts in the bosom of her grateful soil, thereby allowing their own reason and intelligence to be the dupe of foreign ignorance, envy and rivalry. ‘France,’ says a French writer, (who seems more conversant with flowers of rhetoric than with those of horticulture) ‘possesses in her vineyards mines of wealth, whose advantages are furnished by natural causes which secure to her a superiority in this respect which no other nation can dispute.’ Happily for ourselves, we live in an age and country in which the people are but little prone to credit such exclusive possession of nature’s gifts, and it will create exceeding disappointment in all unprejudiced minds, if the lapse of a few short years shall not place this affected superiority of France among the fictions and delusions of former ages. Bountiful nature, replete with benevolence, has bestowed on us every favor within her gift, and asks only of man to aid the developement of her intrinsic riches by the hand of culture. As to the assertions advanced by some foreign writers, that the same grape varies so much by removal as to entirely lose its character, and that the same kind of wine can in no case be made from it in dif-

* Behold America thy rival!

ferent localities, they certainly cannot be supported by facts, and have principally obtained currency and credence by repetition. That the quality of the fruit may be varied by soil, climate, &c. to a certain degree is acknowledged and has been already avowed; the grapes may also be less mature and spirituous in an unfavorable situation, or they may not mature at all in a too rigorous or northern locality, but it does not thence arise that the grape loses its character any more than might be said of an orange tree, which, when transplanted too far north, should perish totally. For much as its product may be varied and modified by the operation of diverse causes on the maturity of the fruit, and by changes in the process of making wines; still the primitive character is maintained, and the same grape may be recognized; and however remote the countries may be in which it is planted, a doubt can scarcely exist but that a similar climate attended by the same mode of culture, and a like process in making the wine, will be attended with similar results.

It is however within the bounds of reasonable supposition, that species peculiar to any country with their attendant varieties, may in some cases possess a natural aptness or applicability to their respective regions. But even this peculiar adaptation subsides after removal by long culture; for it must be borne in mind, that the species of the vine now the most cultivated, was a stranger to all those countries where it now receives its fullest development; alike to the vineyards of France, Tokay, Spain, Oporto, the Cape, and the Madeira isles. And even in several of the West India islands, beneath a tropical sun, a number of varieties are successfully cultivated, a fact of which European writers seem to be absolutely ignorant.

The extent of our territory over which the vine culture may be advantageously diffused, will afford a subject for much speculation. A doctrine advanced by European writers, is, that the region of the maize culture is also that of the vine. This region in France extends from the Mediterranean coast nearly to the Loire, including Poitou, and the country south of a line from thence to Nancy. The wine country of France extends from the Mediterranean to the north of that line, since profitable vineyards are found in Champagne, Maine, Orleans, and the central part of Lorraine, where the maize is never cultivated as a crop. By parity of reason, the vine may be cultivated with equal profit, from the gulf of Mexico to those parts of the union which lie rather further to the north than where the maize or Indian corn is to be considered a sure crop.

‘It is probable that hybrids betwixt the European vine (*Vitis vinifera*) and those of the United States, would better answer the variable climates of North America, than the unacclimated vine of Europe. When a portion of the same industry shall have been bestowed upon the cultivation of the native vines of America, which has for so many ages and by so many nations been devoted to the amelioration of *Vitis vinifera*, we cannot imagine that the citizens of the United States will be longer indebted to Europe for the luxury of wine. It is not, however, in the wilds of uncultivated nature that we are to obtain vines worthy of cultivation; were this the case, Europe would to the present have known no other *Malus* than the worthless austere crab, in place of the finest apple—no other *Pyrus* than the acerb and inedible *Pyraster* or stone pear, from which cultivation has obtained all the other varieties. It is from seed that new and valuable varieties are invariably to be obtained. There is, however, at the present time, a variety of one of the native species cultivated under the name of Bland’s grape, a hybrid no way in my opinion inferior to some of the best European grapes.’*

The peach and the vine being natural productions of the same region of the east, the opinion has been uniformly adopted, that a climate favorable to the one could not fail to be suitable to the other. And where, let me ask, does the former thrive to a greater degree than in many sections of our country? From the shores of Long Island, and even much farther north, to the most southern limits of the union, the peach flourishes and produces fruit of the highest quality. In the south of France and Italy, the culture of the more choice and delicious varieties had given to those climes a fame, to cope with which required the possession by other countries of such as combined equal natural merits. The choicest they could boast have been latterly introduced among us, and we have also originated many most luscious seminal varieties; and those who possess them know from their own experience, and from the opinions of others who are familiar with the produce of the countries referred to, that in this fruit we have no longer a rival in Europe. Hence we may deduce the most sure prospects of an equal success for the vine, whose culture when compared with that of the peach, is yet in its infancy.

The power, wealth and happiness of France are principally attributable to the foresight she has evinced in the introduction to her soil of the most valuable natural productions of

* Prof. Nuttall of Harvard University.

other countries. It has been remarked that perhaps no enterprise in rural economy devised by the genius of a single man, has carried with it more important results than the first plantation of the mulberry in the garden of the Tuilleries, formed at the commencement of the seventeenth century, by the command of Henry IV. At this moment, though but little more than a century has elapsed, during only the latter part of which suitable attention has been paid to the culture of silk, the value of the raw material amounts to \$4,700,000, and that of its fabrication to above \$16,000,000, making a total of about \$21,000,000. The olive, the almond and the fig, were in like manner adopted in the agriculture of France, together with numerous other fruits of minor importance. The vines indigenous to her soil were absolutely worthless, and those originally brought from other countries were not superior in quality to many of the native kinds found in our forests; and the number of esteemed French varieties, even as late as the year 1720, was far less than we are already able to enumerate as the natural products of our woods and prairies, the spontaneous gifts of nature, unaided by the hand of man. Yet, at the present period, that adopted country of the vine has nearly 4,000,000 of acres devoted to its culture, which yield an annual product of 1,000,000,000 gallons, of the average value of more than \$150,000,000.

And what country ever presented a more eligible theatre for agricultural pursuits than the United States? The land proprietors are not oppressed by feudal tenures, exorbitant taxes, vexatious tithes, or exhausting poor rates. The land is both fertile and cheap, and the great diversity of soil and climate seem to invite the introduction of the varied products of other climes. The country penetrated in every direction, even to its remotest bounds, by navigable rivers, and intersected by canals and artificial roads, offers every advantage for speedy transmission of its productions.

What a revolution has not the introduction of cotton already effected! What results does not the silk culture already promise us as our reward at no distant day!

The sugar cane, for which France and the residue of Europe are dependent on the Indies, already forms a most important item among our productions, and promises ere long to be ranked among our exports.

The product of the vine in like manner will be ours, with all its attendant advantages and blessings. The olive culture is already extending in the south; and the almond, the fig, the date, the orange, lemon, lime, citron, filbert, maron, pome-

granate, guava, stone pine, and almost every other production which has been heretofore enumerated among our importations, are destined hereafter to become the abundant products of our own fields, and articles of supply to other nations. Such are the happy coincidences of country, of climate and of government, that all which is required of us is but to exercise our judgment and our skill in perfecting the advantages which nature has so liberally tendered; by the exercise of which, the balance of trade, of wealth and of power, cannot fail to be forever secured to us.

'The vine culture seems to have become a favorite pursuit with the agriculturists of the present day, and forms an object of great promise in York county, Pa. Experiments have already shown that the vine will not only flourish in the poorer soils of that county, but that excellent wine can be made there, and that vineyards will become as profitable as any other agricultural pursuit. A portion of the lands in York county is poor and thin, commonly called barrens, and it has been proved that the vine succeeds well on it, and twenty acres of it, which can now be bought at from 6 to \$10 per acre, when planted with vines, and at maturity, will be more productive to the owner than two hundred acres of the best land in the country, devoted to other culture. There are perhaps not less than thirty or forty vineyards within twenty miles of the borough of York, and nearly all commenced within three years. Should this disposition increase, and as a consequence the wine press be made to take the place of the distillery, it will benefit the morals of the community. Among what are called *civilized* nations, the vice of drunkenness has always been found to prevail most extensively where the vine is not cultivated: while, on the other hand, where that culture is widely extended, the temperance of the people is proverbial.'

Similar sentiments and like prospects of success seem to pervade all parts of our country where the culture of the vine has received merited attention; and the daily increasing devotion to the subject in the formation of additional vineyards, will ere long cause each section of our republic to respond to the efforts of the others.

Suffice it here to say, that a degree of perseverance and enthusiasm seems to pervade all the votaries of this delightful pursuit, and a warm and friendly interchange of views and sentiments exists among them, which has been comparatively unknown in other species of culture: and although the operators, from being disseminated over so great an extent of

territory, are consequently more widely separated from each other, still the existence of a connecting link, by friendly co-operation in one common cause, may justly and appropriately assimilate their united exertions to that joyous period in the history of France, when, during the reign of Probus, thousands of all ages and sexes united in one spontaneous and enthusiastic effort for the restoration of their vineyards. Nor indeed when the far greater limits of our territory are considered, can the combined efforts of our fellow countrymen fail to produce effects even more important, from the greater extent of their influence.

The opinions of some political writers, that we should continue to import adulterated wines and spirits of all kinds, in order to afford the government the means of thence deriving a revenue of *a per centage on their value*, even at the sacrifice of the morals of the nation, and the diminution of its wealth, by a course seemingly less objectionable, because less direct, but which is not less fatal in exhausting our resources, seem fast merging to that oblivion where the desire and the pride of a truly national independence should consign them; and we may hope that the day is not far distant, when America will fully establish and claim a rivalry with the most favored lands of the vine and the olive, and proudly disclaim being tributary to any foreign clime.*

SILVER.

CLASS—*Metallic*, comprising metals. GENUS—*Argentum*, comprising silver.

SILVER has been reckoned among the noble or perfect metals, and has been known from the earliest ages of the world. Its scarcity, beauty and utility have always rendered it an object of research among mankind, so that the nature and properties of this metal have been long studied and minutely investigated.

Silver is found alloyed and mineralized with numerous substances. Sulphur, alumine, antimony, lead, arsenic, copper,

* The preceding remarks on the Vine are principally from the pen of Mr. W. R. Prince of New York, whose Treatise on the Culture of the Vine we cheerfully recommend to all who make this plant an object of cultivation.

mercury, carbonic acid, muriatic acid, &c., have been found combined with silver, and little of this metal is found in most lead mines. Silver is a rare ore in North America. It is very abundant in Mexico and South America, particularly among the Andes. Mexico yields about \$22,000,000, and Peru, Chili and Buenos Ayres \$10,000,000 annually. The first mines were discovered at Potosi, by an Indian, who tore up a bush in ascending the mountain, and found a mass of silver beneath it. Huantaya, in Peru, and Guanaxuato, in Mexico, contain some of the most productive mines. The latter has a vein of silver ore 180 feet wide, and 1600 feet deep. The quantity of silver found in other parts of the world is comparatively insignificant. The principal mines of Europe are those of Schemnitz and Kremnitz, in Hungary, and of Kongsberg, in Norway.

Silver is a heavy, sonorous, brilliant, white metal, only moderately hard, but exceedingly ductile, and of great malleability and tenacity. Its weight is $10\frac{1}{2}$ times heavier than water, and becomes fusible in a temperature of 1892° F. above zero.

This metal ranks next in value to gold. Like gold it is coined into money, and is manufactured into various kinds of utensils, such as goblets, vases, spoons and dishes, which have the general appellation of *silver plate*. For all these purposes it is alloyed with copper, which does not effect its whiteness, and is not easily detected unless it be in too great proportion. The intention of this is to render it harder than it would otherwise be, and thereby the better to adapt it to receive fine and sharp impressions on being cast. The standard silver of the British coins contains 18 pennyweights of copper in a pound Troy of silver; and in the United States 1664 grains of silver contain 179 grains of copper.

With the exception of platina and gold, silver is considered the most unchangeable of all metals. The air does not easily act upon its surface in such a manner as to injure it; but when long exposed to the atmosphere, especially in frequented or smoky places, it acquires a covering or rust of dark brown color, which, on examination, is found to be what chemists call *sulphuret of silver*. The fumes of sulphur and other inflammable substances blacken it. Various powders have been contrived with a view to restore to plate its original lustre; but these should be used with caution, as some of them are very injurious.

Silver is nearly as ductile as gold. It may be beaten into leaves so thin that a single grain in weight will cover a space

of more than 51 inches; and it may be drawn into wire much finer than a human hair—indeed, so fine that a single grain of it has, in this form, been extended nearly to the length of 400 feet. It is this wire gilded that has the name of *gold wire*; and what is denominated *gold lace* is but flattened silver thread gilt, twisted round silk and woven.

The plating of copper with silver is a very useful operation, and is thus performed:—plates of silver are bound with iron wire upon small ingots of copper. The quantity generally allowed is one ounce of silver to twelve ounces of copper. The surface of the plate of silver is made not quite so large as that of the copper; and upon the edges of the copper, which are not covered by the silver, a little borax is put. By exposing the whole to a strong heat the borax melts, and in melting contributes to fuse that part of the silver to which it is contiguous, and to attach it, in that state, to the copper. The ingot, with its silver plate, is then rolled between steel rollers moved by machinery till it is of proper thickness. It is afterwards cut into such sizes and to such shapes as may be required for use. An ounce of silver is thus often rolled out into a surface of three square feet, having its thickness upon the copper, not more than the three-thousandth part of an inch. Hence we ought not to be surprised at the silver being soon worn from the sharp edges of plated goods. To prevent this, it is customary, with the best articles, to have all the edges, and the parts liable to be worn, formed to a considerable thickness of silver.

What is called *French plate* is made by heating copper, or more perfectly brass, to a certain degree, then applying leaf silver to the surface, and strongly rubbing it with a burnisher. The durability of this plating depends, of course, on the number of leaves which are applied on a given surface. For ornaments that are not much used, ten leaves may be sufficient; but a hundred will not last long, if the metal be exposed to frequent handling or washing.

Silver coin is alloyed with copper, as 12½ to 1; from which alloy silver may be obtained pure, by forming a nitrate of it, and then precipitating it by solid metallic copper.

ILLUSTRATION. Put some nitric acid into a wine glass diluted with an equal bulk of water. Drop into it a six cent piece, and let it remain until action ceases. Then take out the undissolved silver, and put in a plate, or a cent, of perfectly clean bright copper. The silver will be precipitated after a short time. Wash the powder several times; and put a little liquid ammonia into the water for the first washings.

Then melt down the powder into a solid mass, which will be pure silver.

APPLICATION. It is very convenient to have a ready method for obtaining pure silver from coin when it is wanted for a particular purpose. But silver is harder and will wear longer if it contains a little copper. Ever so small a quantity of copper, however, in a finger ring or in any jewelry, which comes in contact with the skin, will tarnish.

Silver will combine with nitric acid and form the nitrate of silver, called lunar caustic, or lapis infernalis.

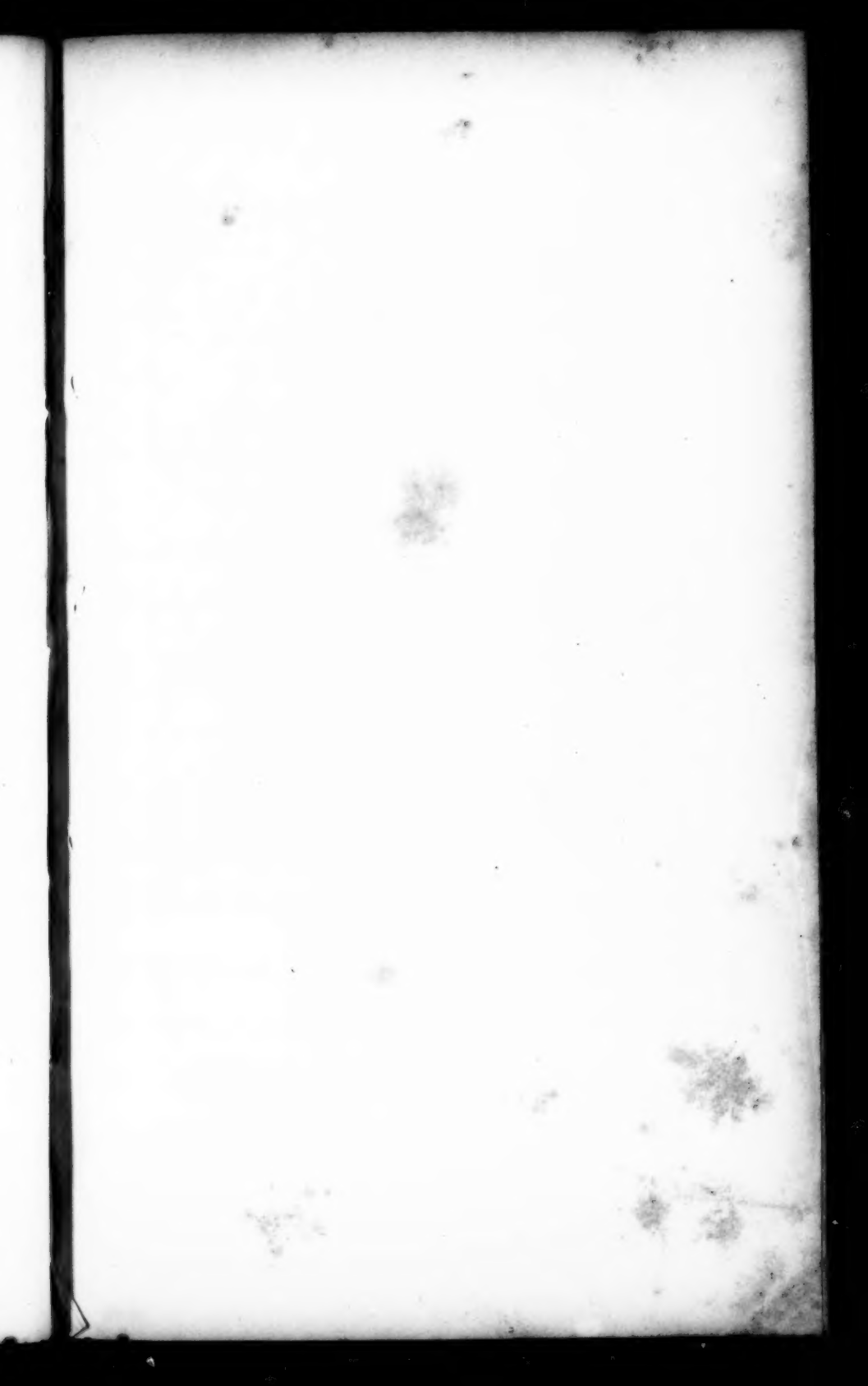
ILLUSTRATION. Put nitric acid into a wine glass diluted as before. Drop in a piece of pure silver, and let it remain till action ceases. Take out the remainder of the silver. Evaporate the solution to a solid salt.

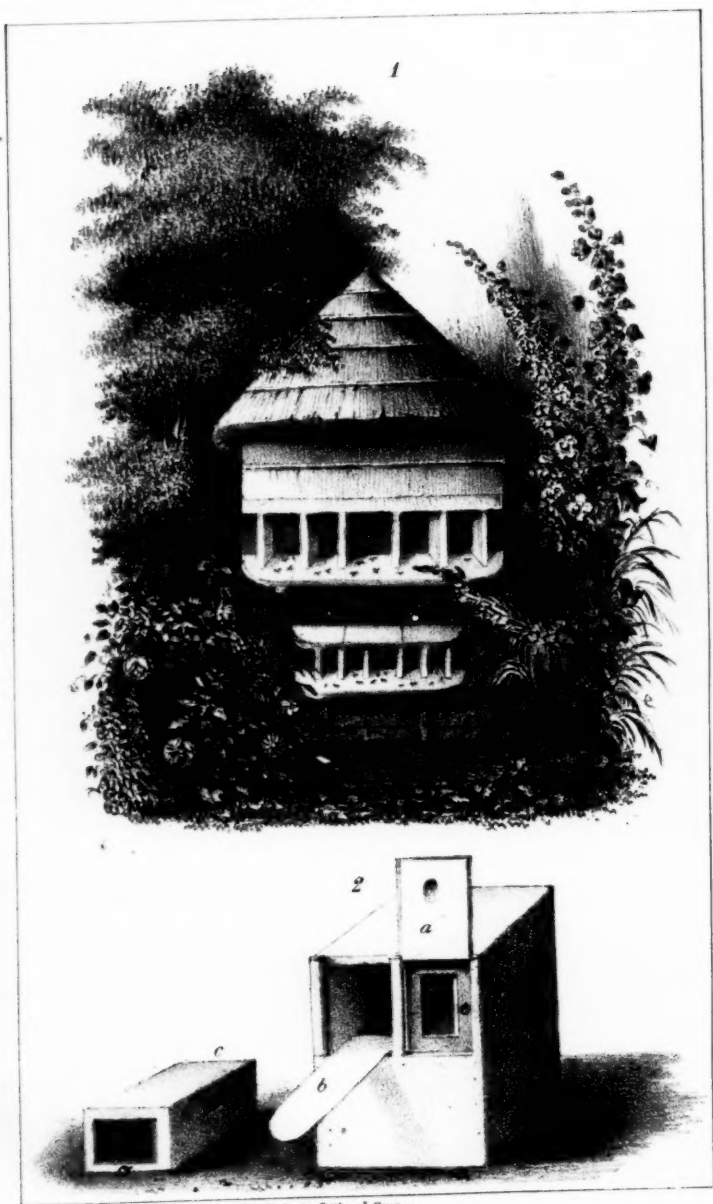
APPLICATION. This salt is used in medicine, and for a test of the presence of muriatic acid in mineral waters, &c. An *indelible ink* is also made, by dissolving it in pure water and then adding a little vinegar, also adding a little gum-arabic to give it consistency. If a piece of cotton or linen be dipped into a weak solution of pearlash, and then dried under a moderately heated smoothing iron, it may be written on with a clean pen dipped in this solution, and the writing will never wash out. Those who do not wish to take the trouble to make the lunar caustic, may always find it at every druggist's shop.

Copper may be coated with silver, if rubbed with it when in the state of a powder combined with some of the salts.

ILLUSTRATION. Make a powder as follows;—take a few grains of silver in powder, as precipitated by copper in the first experiment, after it is washed and before melting—about an equal weight of alum or a little more—six times as much table salt—also six times as much tartrate of potash. Pulverize all these articles and rub them well together. Rub the clean bright surface of a piece of copper with this powder and it will be silvered.

APPLICATION. Though this silvering is not very durable, it will defend the surface of copper from tarnishing while it lasts; and it may be easily renewed. Plating copper is much preferable. This is done by brazing on a thin bar of silver upon a thick bar of copper. Then both are rolled out into the proper thickness for use.





Foulden's Lithog. Boston.

